NON-TECHNICAL SUMMARY

Study Title: Archaeological Damage from Offshore Dredging: Recommendations for Pre-Operational Surveys and Mitigation During Dredging to Avoid Adverse Impacts

Report Title: same

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Background: The Minerals Management Service (MMS) is charged with environmentally responsible management of Federal Outer Continental Shelf sand and gravel resources, that is, those resources lying seaward of the State/Federal boundary. The National Historic Preservation Act requires Federal agencies to protect historic and cultural resources which include shipwrecks, historic fortifications, and coastal settlements, as well as prehistoric sites that have become submerged due to the global and local rise in sea level. As a federal agency, the MMS must make sure that any significant archaeological and historic sites that may be present on the outer continental shelf are not damaged as a result of dredging for sand and gravel. In addition, sunken features such as shipwrecks provide fish habitat and are important areas for extensive sport fishing and sport diving. Therefore, MMS funded this current study to review its current practices and procedures related to identification and protection of archaeological resources.

Objectives: The objectives were to understand how and why archaeological sites are damaged during dredging and what methods can be used to prevent damage.

Methods: We conducted worldwide surveys of dredging companies and marine archaeologists who study submerged sites. Dredging operators were asked about the dredging methods they use and the precautions they follow when working in areas that have archaeological sites present. We looked at two types of submerged sites: prehistoric sites where the remains of early humans were flooded by the rise in sea level and shipwrecks. We summarized the current state-of-the art methods for surveying underwater areas to look for archaeological sites. MMS currently requires systematic surveys of the proposed dredging site to make sure that there are no archaeological sites, pipelines, cables, etc. Shipwrecks are relatively easy to identify, as long as you use good methods, since they often are on the surface and contain metal objects that can be detected using magnetometers. Prehistoric sites are more difficult, since they are often buried and do not contain metal objects.

The best ways to protect archaeological sites is to 1) conduct detailed surveys so the sites can be identified, then 2) define a buffer or exclusion zone around each site so that there is little likelihood that the dredge will too close to the site. It is also important to monitor during and after dredging to make sure that the buffer zones were actually avoided.

Significant Results: Recommendations to avoid adverse impacts to archaeological resources during offshore dredging are summarized below.

Data on the location and types of archaeological resources should be managed using specialized computer-mapping methods. The data can be better managed, used, and shared.

New studies are needed to better understand the types and locations of archaeological sites in offshore areas. Much of what is currently known is based on studies that are over 20 years old. These data need to be updated, using more modern equipment and data analysis methods. More knowledge about these sites will support better approaches to protection. Better studies are needed for prehistoric sites that are composed of materials that cannot be identified using standard methods, such as magnetometer surveys.

Current specifications for archaeological surveys need to be updated, to reflect the technology that is readily available and state-of-the-art. The report includes many recommendations on the detailed requirements for these surveys. The most important ones include used of highly accurate positioning equipment so that the locations of the sites can be precisely determined, closer spacing of survey lines, and use of equipment that can record the data digitally.

There needs to be a more scientific basis for specifying buffer zones. Right now, it is mostly based on our best judgment. The issues include both protection of a site from being damaged during dredging and preventing future damage from erosion under the site as the seafloor re-adjusted around the dredged area. It would be much better to develop and test formulas that consider the depth of dredging, positional accuracy, seafloor stability, site size, etc. Also, buffer zones should be monitored in the field, so that we can know if they were effective, under a range of conditions. With field data, we would be able to develop validated buffer zones.

Dredge operators should be required to use the technology that is readily available today whereby they can track precisely the position of the dredging equipment. With this technology, they could plot in real-time the position of the dredge compared to the buffer zones. Alarms could be set so that the operator would know if they were getting too close to a site.

It may be appropriate to have an experienced person on board the dredge during actual dredging operations to make sure that archaeological sites are not damaged. Another approach is to have a reward/penalty system to encourage operators to report when they think they have found a site.

MMS should require all the data collected during archaeological surveys and the report to be delivered in digital format. The survey data, in particular, should be delivered in formats that can be used in computer mapping applications.

Study Products: Research Planning, Inc., Tidewater Atlantic Research, Inc., and Baird & Associates Ltd., 2004. Archaeological Damage from Offshore Dredging: Recommendations for Pre-Operational Surveys and Mitigation During Dredging to Avoid Adverse Impacts. U.S. Department of the Interior, Minerals Management Service, Sand and Gravel Unit, Leasing Division, Herndon, VA. OCS Report MMS 2004-005, 75 pp. + appendices.